What Is Claimed Is:

1. A VCSEL having improved diffraction loss, comprising:

a series of deposited material layers comprising the structure of said VCSEL; and

an intracavity lens formed in one of said series of deposited material layers.

2. A VCSEL according to claim 1 wherein one of said series of deposited material layers comprises a superlattice structure, with an adjacent region being subjected to ion implantation and rapid thermal annealing so as to disorder the superlattice structure and change its index of refraction, whereby to create said intracavity lens.

3. A VCSEL according to claim 2 wherein said series of deposited material layers comprises:

a bottom mirror deposited on the top of a substrate;

a bottom spacer deposited on the top of said bottom mirror;

a gain region deposited on the top of said bottom spacer;

a top spacer deposited on the top of said gain region; and

a top mirror deposited on the top of said top spacer, such that a reflective cavity is formed between said bottom mirror and said top mirror;

with said intracavity lens being formed in at least one of said bottom mirror, bottom spacer, gain region, top spacer and top mirror.

4. A VCSEL according to claim 3 wherein said substrate comprises a semiconductor material.

5. A VCSEL according to claim 3 wherein said bottom mirror and said top mirror comprise a semiconductor material.

6. A VCSEL according to claim 5 wherein said semiconductor material is chosen from the group consisting of Si, GaAs and InP.

7. A VCSEL according to claim 3 wherein said bottom spacer and said top spacer comprise a semiconductor material.

8. A VCSEL according to claim 7 wherein said bottom spacer and said top spacer comprise InP.

9. A VCSEL according to claim 3 wherein said gain region comprises a multiple quantum well structure.

10. A VCSEL according to claim 9 wherein said gain region comprises a material chosen from the group consisting of InGaAsP and InGaAs.

11. A VCSEL according to claim 9 wherein said ion implantation uses ions selected from the group consisting of phosphorus, oxygen, helium and indium.

12. A method for reducing diffraction loss in a VCSEL structure, said method comprising:

forming material layers comprising said VCSEL;

with an intracavity lens being formed in one of said material layers.

13. A method according to claim 12 wherein one of said material layers comprises a superlattice structure; and

further comprising subjecting the then-formed structure to ion implantation and rapid thermal annealing so as to disorder the superlattice structure and change its index of refraction, whereby to create said intracavity lens.

14. A method according to claim 13 wherein, prior to ion implantation, a masking layer is applied to the then-formed structure.

15. A method according to claim 14 wherein said masking layer has a non-uniform thickness so as to create a spatially-varying index in the intracavity lens.

16. A method according to claim 14 wherein, subsequent to ion implantation and prior to annealing, said masking layer is replaced by a proximity cap.

17. A method according to claim 13 wherein forming said material layers comprises:

(a) providing a substrate;

(b) forming a bottom mirror on the top surface of said substrate;

(c) forming a bottom spacer on the top surface of said bottom mirror;

(d) forming a gain region on the top surface of said bottom spacer;

(e) forming a top spacer on the top surface of said gain region; and

(f) forming a top mirror on the top surface of said top spacer, such that a reflective cavity is formed between said bottom mirror and said top mirror.

18. A method according to claim 17 wherein said substrate comprises a semiconductor material.

19. A method according to claim 17 wherein said bottom mirror and said top mirror comprise a semiconductor material.

20. A method according to claim 19 wherein said semiconductor material is chosen from the group consisting of Si, GaAs and InP.

21. A method according to claim 17 wherein said bottom spacer and said top spacer comprise a semiconductor material.

22. A method according to claim 21 wherein said bottom spacer and said top spacer comprise InP.

23. A method according to claim 17 wherein said gain region comprises a multiple quantum well structure.

24. A VCSEL according to claim 23 wherein said gain region comprises a material chosen from the group consisting of InGaAsP and InGaAs.

25. A method according to claim 23 wherein said ion implantation uses ions selected from the group consisting of phosphorus, oxygen, helium and indium.